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A NEW SALAMANDER OF THE GENUS *CHIROPTEROTRITON* (CAUDATA: PLETHODONTIDAE) FROM MEXICO.

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As Martin (1958:12) has noted, the karst caves of the Sierra Madre Oriental of Mexico are important amphibian habitats. Most of the salamander species found in such caves are widespread forms, but at least one described species from San Luis Potosí, *Chiropterotriton mosaueri*, is probably restricted to caves. Another species apparently in this category is described below. For it, I propose the name:

CHIROPTEROTRITON MAGNIPES sp. nov.

Figs. 1, 2

Holotype. — Museum of Comparative Zoology 30607, a young adult male collected in the Cueva de Potrerillos, about 2 km WSW of Ahuacatlán, which is approximately 8 km SW of Xilitla, San Luis Potosí, Mexico, on 18 November 1955 by Alejandro Villalobos F.

Paratypes. — MCZ 44033, CNHM 142457, and four uncatalogued specimens from the type locality in the collection of the Instituto Politecnico Nacional, Mexico, collected on 20 January 1952 by F. Bonet; UMMZ 125423 (GH 9878), collected at the type locality in July 1964 by Kraig Adler; CNHM 142458, UMMZ 125179, and three uncatalogued males in the Instituto Politecnico collection from Cueva del Madroño, near Laguna Colorada, Municipio de Landa de Matamoros, Querétaro, Mexico, collected on 16 January 1952 by F. Bonet.

Diagnosis. — A species distinguished from all others in the genus by its very fully webbed feet, large size (adults 40–60 mm snout-vent length) and greater number of teeth (average of 79 maxillary-premaxillary in adult males).

Description of the holotype. — General habitus long and depressed. Tail relatively short (slightly less than snout-vent length), rounded in cross section. Basal constriction of tail not indicated. Limbs relatively long; adpressed limbs overlap by two or more costal spaces. Feet broad; toes and fingers joined by thick webbing. On foot, webbing indented between digits 2-3, 3-4, and 4-5 to level of distal end of penultimate phalanx of digits 3 and 4 (Fig. 1). Terminal pads, subtending digits 2-5 on foot and 2-4 on hand, present but not prominently developed, palmar surfaces of hand and foot otherwise smooth. Contours of digits not prominent dorsally, except for pigmentless areas marking some joints. Head flat and wide, eyes large and bulging. Prominent subocular groove extending in an arc from anterior corner of eye to position beneath posterior corner of eye. Postocular and other cephalic and nuchal grooves weakly developed. Viewed from above, snout truncate. Labial protuberances small. Total number of maxillary-premaxillary teeth 80; 64 countable mandibular teeth (dentary broken on left side near symphysis). Vomerine teeth in slightly arched single rows numbering 13 on each side. Teeth on posterior vomerine shelf beneath parasphenoid 93, arranged in two obovate patches slightly separated in midline. Skin rather thin. Mental gland not prominent, although marked by less pigment than rest of chin. Cloacal papillae well developed. Two symmetrical pockets with slit-like openings in dorsal posterior cloacal wall. Testis unilobate, pigmentless. Color of body in alcohol uniform dark lavender-brown above, somewhat lighter on ventral surfaces and feet. Palmar surfaces pigmentless. Post-iliac gland weakly indicated by light area. Anterior ends of ceratohyals blade-like, relatively narrow. Transverse processes of first caudal vertebra extend anteriorly to midpoint of preceding postsacral vertebra (see Fig. 2). Distal tarsal 5 large, articulating with fibulare and centrale 2-3; distal tarsal 4 accordingly not in contact with fibulare. Terminal phalanges with T-shaped distal ends. Measurements in mm, following techniques in Rabb (1958): Total length, 78; snout-vent length, 40.2; head width, 8.0; eye width, 3.2; nostril width, 0.4; snout-eye length, 1.8; snout-angle of jaw length, 7.1; arm length, 13.8; leg length 14.5; hind foot width, 6.5.

Variation. — The holotype is the smallest of the specimens studied. The others are variously shrunk by preservative, but the measurements are generally comparable (Table 1). Sexual dimorphism is apparent in the longer snout of the larger males, and perhaps in their relatively wider heads. Females evidently reach a larger size than the males, since three of the four available are

longer than the oldest and largest male. The tail is proportionately longer in males. The average number of vomerine and maxillary-premaxillary teeth is greater in the females, possibly reflecting the larger size and probably greater age of the females.

There is no marked difference detectable in the numbers of teeth in the three age classes represented among the males, although the high vomerine count of the largest male suggests a slight increase with age. The two larger males from Cueva de Potrerillos have some melanophores in the covering of the testes, but there is no such pigmentation in those from Cueva del Madroño. The number of glands in the mental cluster ranged from about 240 to 390 in the three males examined.

There is slight variation in the amount of webbing of the feet, but the average arrangement is that described for the type.

Habitat. — The type locality was well described by Bonet (1953). The cave is at an altitude of about 1300 m, and apparently in what was originally a cloud forest zone. According to the field notes of Dr. Villalobos, the topography of the cave in 1955 was considerably changed from that seen by Bonet in 1952.

Bonet (*op. cit.*) also provided data on the Cueva del Madroño, which is at an altitude of 1810 m in mixed pine-oak woods containing madroño (*Arbutus*) and *Carya*. The stalagmites in the cave were actively growing in 1952.

Judging from Bonet's account, *Chiropterotriton magnipes* was common in both the Cueva de Potrerillos and the Cueva del Madroño along with various cavernicolous arthropods. However, *C. magnipes* is not the only cave-inhabiting salamander in the region. A specimen collected by Dr. Villalobos at Cueva de la Hoya, which is only 3 km from the Cueva de Potrerillos, is referable to *C. arboreus* (MCZ 30605).

Relationships and comparisons. — The genus *Chiropterotriton* is composed of a group of Central American boletoglossal plethodontids that has a distinctive, relatively delicate, general habitus but few diagnostic characteristics. Taylor (1944) defined the group on the basis of the partial webbing of the feet. Tanner (1952) described the throat anatomy in various species, and Rabb (1956) described the skull and other anatomical features of the apparently most primitive species of the group. David Wake (*in litt.*) has informed me that the tarsal arrangement mentioned for *C. magnipes* distinguishes many members of the genus from the species groups in *Pseudoeurycea*. Although the foot shape is like that of certain species of *Bolitoglossa*, *C. magnipes* clearly belongs to the genus

Chiropterotriton in respect to general habitus, tarsal pattern, sublingual fold, form of the ceratohyal, and such features of its skeletal anatomy as can be determined from X-rays and one cleared and stained specimen (CNHM 142458). Wake and Brame (1963) indicated that fully-webbed conditions of the feet developed several times within the genus *Bolitoglossa*. The occurrence of a similar condition in a species of *Chiropterotriton* lends indirect support to their idea.

The feet of *Chiropterotriton magnipes* are unique in the genus in fullness of webbing and pad-like structure. The closest approach to the condition in *C. magnipes* is in an unnamed form from El Chihue, Tamaulipas (illustrated in Rabb, 1958, pl. II).

In proportions, *C. magnipes* differs from other *Chiropterotriton* in having a somewhat wider head (average, 19.1 per cent of snout-vent length in males). In relation to head length, *C. magnipes* has a large eye (average percentage, 35.5, ♂♂; 37.9, ♀♀), although the proportion is matched in *C. multidentatus* from Rancho del Cielo, Tamaulipas and El Chico, Hidalgo, and in the short-snouted species *C. bromeliacia*. In adults of most forms, this proportion is 29 to 33 per cent.

The tooth count averages in *C. magnipes* exceed the maxima for all other forms. However, the size of individual teeth in *C. magnipes* is small. The largest premaxillary teeth in males project about 0.25 mm from the gum, and the ordinary maxillary and dentary teeth are about half this size.

The foot structure and long limbs of *Chiropterotriton magnipes* indicate scansorial habits. The lack of testis pigmentation and the large eye suggest that the species is truly troglodytic and not a casual cave inhabitant. In these respects the species is slightly more specialized than the cave-dwelling *C. mosaueri* and the Tamaulipan *Chiropterotriton* with a large foot. Presumably its closest relationships are with these and other large, arboreal or scansorial northern Mexican species of the genus (*C. multidentatus*, *C. arboreus*).

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the beryllium-window machine at the University of Michigan by Kraig Adler. The prints are the work of Raymond Simpson. Abbreviations besides those indicated above are: MCZ, Museum of Comparative Zoology, and CNHM, Chicago Natural History Museum.

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TABLE I
Quantitative data on the type series of *Chiropterotriton magnipes*¹

Cueva de Potrillo		Cueva del Madroño	
MCZ	MCZ	CNHAI	CNHAI
30607	14033	142458	125179
♂1	♂2	♂3	♂2
40.2	53.1	55.2	50.0
Snout-vent length (mm)			
37.8	58.6	65	53.6
Tail length (mm)			
17.66	20.72	19.20	21.40
Snout to jaw/snout to vent (%)			
19.90	19.02	18.30	19.80
Head width/snout-vent length			
25.53	34.25	38.57	36.62
Snout to eye/snout to jaw			
22.64	37.31	40.30	42.19
Snout to eye/head width			
26	26	41	23
Number of vomerine teeth			
80	75	83	77
Number of maxillary-premaxillary teeth			
64	67	100	100
Number of dentary teeth			

¹ Instituto Politécnico specimens were uncatalogued.
Numerals after male symbols indicate number of testis lobes.
Plus symbol indicates incomplete count or broken tail.



Fig. 1. *Chiropterotriton magnipes* sp. nov., holotype MCZ 30607. $\times 2.1$.

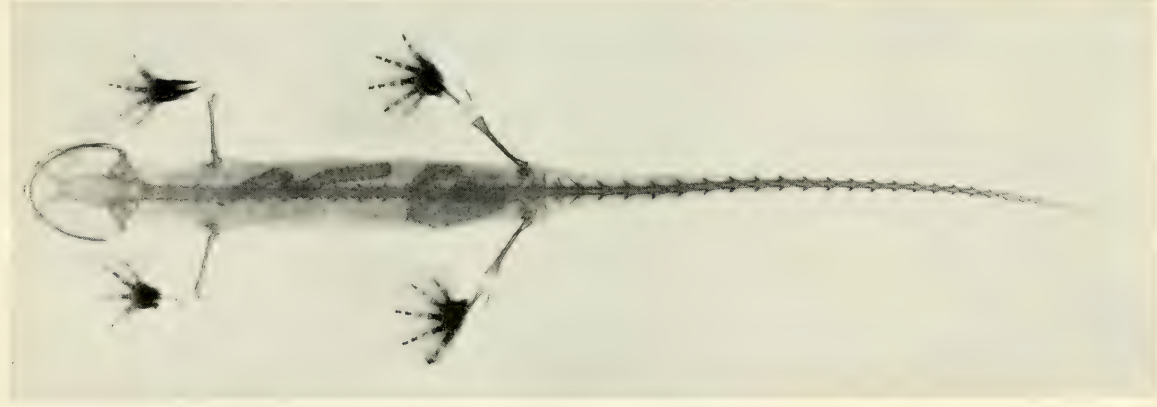


Fig. 2. Radiograph of *Chiropterorhizon magnipes*, UMMZ 125423 (GH 9878), an adult female. Right maxilla is broken. Arthropods in the gut obscure body vertebrae. $\times 1.25$.